URANIUM IN DRINKING WATER: A FUTURE CHALLENGE FOR FINNISH WATER SUPPLY PLANTS?

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Parametric value for uranium was excluded from the EU Drinking Water Directive (DWD) in 1998. The revision of DWD is under way, and the 2008 proposal for updating chemical parameters includes uranium with a recommended parametric value of 30 $\mu g \cdot L^{-1}$. The proposal also pays attention to the parametric values set by WHO, Health Canada and US-EPA which are 15, 20 and 30 $\mu g \cdot L^{-1}$, respectively.

Uranium in private well waters has been extensively studied in Finland since 1970s and extremely high concentrations have occasionally been found in bedrock aquifers. Presently, 91% of citizens are, however, connected to public water services. The Guide ST-12.3 from 1993 has obliged water supply plants to screen gross alpha, gross beta and radon concentration in all new ground water resources before they plan to start abstracting water. Gross-alpha concentration provides only approximation of uranium levels rather than exact concentration.

A population-based random survey was initiated in order to evaluate public exposure to uranium in Finland. The survey also included sampling of drinking water straight from the tap. The method was chosen in order to reflect the true intake via drinking water. In total, 548 samples from 204 water supply plants were analyzed. The coverage of the population based on the population of the municipalities was 76%. Since large water supply plants (which all were included in this survey) service most inhabitants in their area of operation, the coverage of the supplied water was even higher.

The population weighed mean uranium concentration was 0.7 $\mu g \cdot L^{-1}$. The mean concentrations of uranium in water produced from surface water and ground water were 0.2 and 0.9 $\mu g \cdot L^{-1}$, respectively. Only one water sample exceeded 15 $\mu g \cdot L^{-1}$ (its concentration was 25 $\mu g \cdot L^{-1}$). The sample was from a water supply plant with three purifying plants and several water abstraction sites. The other two samples from the same supply plant were 0.89 and 2.6 $\mu g \cdot L^{-1}$, which illustrates the complex flow situation in medium-sized and large distribution networks.

Based on the survey, large water supply plants in Finland would comply with a new parametric value for uranium (15–30 $\mu g \cdot L^{-1}$) were it to be included in the revised DWD. Several small water works were not covered in our survey and it is possible that some of them may need to take measures against uranium. If elevated uranium concentrations are found, new water abstraction sites may be required. Another option is to remove uranium during purification process. One such plant was set up in Finland in the late 1990s and, in general terms, the experiences have been good.